

**Division of Water
Human Health Criteria (HHC) Technical Workgroup
Meeting #4 Notes (Draft)
January 4, 2016**

Time of Meeting: 10 AM – 12 PM

Location of Meeting: via GoToMeeting

Technical Workgroup for Water Quality Standards HHC Members present:

- Larry Duffy, University Alaska Fairbanks
- James Fall, Alaska Department of Fish & Game/Division of Subsistence (DF&G/Subsistence); Marylynne Kostick, DF&G/Subsistence
- Bob Gerlach, DEC Division of Environmental Health (DEC/EH)
- Ali Hamade, Alaska Department of Health & Social Services/Division of Public Health (DHSS/DPH)
- Brett Jokela, Anchorage Water and Wastewater Utility
- Alison Kelley, NANA Regional Corporation (NANA)
- Lon Kissinger, US Environmental Protection Agency (USEPA R10)
- Michael Opheim, Seldovia Village Tribe (Seldovia); Tracie Merrill, Seldovia
- Nancy Sonafrank, DEC Division of Water (DEC/DOW)
- Lori Verbrugge, US Fish and Wildlife Service (USFWS)
- Ted Wu, DEC Division of Spill Prevention (DEC/SPAR)
- Kendra Zamzow, Center for Science in Public Participation (CSP2)

Interested Parties present:

- Guy Archibald, Southeast Alaska Conservation Council
- Lincoln Loehr
- Gerald Anelon
- Cheryl Neimi, WA Department of Ecology
- Ron Rimelman
- Matt Szelag, USEPA R10
- Molly Reeves
- Jacki Rose, BlueCrest Energy
- Justin Hogrefe, USACOE
- Jessica Fisher, Hilcorp Alaska, LLC
- Nancy Judd, Wind Ward Environmental
- David Conner
- Steven (Last name not recorded), Seldovia

Meeting Facilitator: Michelle Hale, Director, DEC/DOW

Meeting Notetaker: Gina Shirey, DEC/DOW

**Division of Water
Human Health Criteria (HHC) Technical Workgroup
Meeting #4 Notes (Draft)
January 4, 2016**

Action Items:

Who	Will do What	By (Date)
Lon Kissinger	<ul style="list-style-type: none"> • Provide a copy (or cite page in Methodology) for the decision tree for relative source contribution • Provide a reference to the species that were included in the fish consumption rate that was used to calculate 2015 revised national water quality criteria • Provide a reference to Sandie O'Neill's paper on the use of contaminant body burden papers to demonstrate salmon in Puget Sound were acquiring contaminants from coastal food webs 	January 8
ADF&G	Provide any available studies for where all 5 salmon live while in marine/coastal waters.	January meeting
ADF&G	Provide link to website info on contaminants in Alaska fish	January meeting
ADF&G	Provide top 3 species of marine mammal used for consumption and their trophic level	January meeting

**Agenda for Water Quality Standards HHC Technical Workgroup (HHC Workgroup)
Meeting #4 December 15, 2015:**

- **Review General Agenda**
- **Review of Draft Workgroup Report outline**
 - Discuss draft recommendations for Issues 1 and 3
- **HHC Calculator Tool – How do criteria change as inputs change**
- **Recap Issue #4a (part one) –What species should Alaska include when deriving a Fish Consumption Rate? (See October meeting notes)**
 - Sources of fish and shellfish
 - Local v. commercial
 - Salmon- what OR/WA/ID did and didn't include
 - Other marine fish and mammals
- **Public Comment**

Meeting Documents

1. Technical Workgroup Presentation 4
2. Human Health Criteria Workgroup General Agenda
3. HHC Technical Workgroup Report draft 12-09-15
4. EPA Rule Criteria Table
5. HHC Technical Workgroup October 2015 Meeting #3 Notes

Review General Agenda

Division of Water
Human Health Criteria (HHC) Technical Workgroup
Meeting #4 Notes (Draft)
January 4, 2016

- Michelle started the meeting by touching on overall agenda. She found it was valuable to put everything we're doing into context.
- Michelle wanted the HHC Technical Workgroup Report. The report is currently just a shell right now. It's being introduced now to give idea of final product.
- The HHC Technical Workgroup has had 3 meetings to talk about Issues #1, #3 and #4a.
- Today is the 4th meeting. DEC wanted to slow down a little bit since a lot of information has been put out there. DEC would like to start coming to conclusions with conversations. Then the speed for remaining topics can be reassessed.
- The HHC Technical Workgroup is scheduled for monthly teleconferences continuing in January through May or June. As we get into report, that will dictate the number of meetings. DEC wants to make sure we get to some conclusions in report.

Discussion

- A request was made to schedule the next few meetings ASAP since calendars are filling up. This was a good idea and a doodle poll will be sent out. It was echoed that it was especially important to schedule January and February meetings.
- There was another concern that the workgroup may brush over things due to time constraints. It was suggested that the workgroup have smaller focus groups to look more fully at the issues. This was also thought to be a good idea. It would give everyone more time to tussle with the issues.
- A request was made to get materials to the group quicker. There was a short timeframe to review the materials, especially the draft report, before this meeting. DEC apologized for delay in getting materials. Is two weeks before meeting enough time? Yes.
- Lon clarified that his role in the workgroup is as a technical resource and not necessarily a group member. With regard to the breakout groups, if you choose to do them, it is important to make sure there is a sufficient representation of all interest groups so that there is a balanced view of the issues.
- Yes, the formation of balanced breakout groups is important. And it is important to not go too fast. DEC wants to come out of process with lots of thought put into it.
- There is concern that there is a potential for more policy decisions to be made if the workgroup doesn't have time to go through data. Concern was expressed about defaulting to policy decisions. Would like to see technical decisions based on data.
- At last meeting DEC introduced the concept of policy. DEC needs technical advice. DEC will make final policy calls. While the workgroup is important, it will not be the only means of outreach to discuss broader issues. There will be broader outreach for policy decisions.
- Q: Is DEC planning on having public meetings before rulemaking? Yes. DEC doesn't have a full outreach plan figured out yet, but DEC came away from October meeting with an understanding that we have a lot of outreach to do. This topic is on agenda for AFE. There will be broader outreach before rulemaking.

Review of Draft Workgroup Report outline

Michelle went into technical workgroup report. She wanted to walk through structure of report. The format of the report is based on the antidegradation workgroup report. The report keys up issues

Division of Water
Human Health Criteria (HHC) Technical Workgroup
Meeting #4 Notes (Draft)
January 4, 2016

and then has a discussion and the conclusions of the workgroup along with some recommendations. We're not going to spend much time on the write-up of the issues in the report today. The review today is to look at the format. As the meetings progress, and maybe through breakout groups, meat will be put on the bones. This will be the workgroup's report and not DEC's report. Please send comments on the report (tracked changes or other) to Brock and Nancy at any time.

Michelle walked the workgroup through the format of the report. The Executive Summary will be done later. There is a Table of Contents, short introduction, and a status update. The meat of the report are the HHC issues. For the identified issues, there is a description of the issue, what questions the workgroup considered about the issue, and recommendations. The recommendations will be in call out in boxes. This will be the general format of the report.

The workgroup report will help DEC make decisions. With respect to antidegradation, DEC didn't follow all recommendations from the workgroup for various reasons; however, the antidegradation workgroup report lives on. It is still posted on DEC's webpage.

Discussion

- Q: If there is an issue where there are 2-3 groups, and there is a dominant group, do you include the opinions of the less dominant groups? In the antidegradation report, in the end, there weren't big disagreements. If there seemed to be a split, both opinions/recommendations were in the report. There will not be a vote on an issue so that only one way is put forward. Through conversation, the workgroup may arrive at common understanding of issues, but this is not required. If this is the case, it will be addressed in the report.
- The workgroup will not be getting into the issues in the report at this meeting. There's not much in the report right now. DEC would like to discuss the issues in the report more at the next meeting. Maybe see if the workgroup is comfortable with the first 1-2 recommendations. Taking a deeper look at the report will be added to meeting #5.
- The workgroup can also see if there are issues that need to be looked at deeper. It seems like there hasn't been enough time spent on the issues yet.
- Q: Is it easier to get feedback to DEC by emailing before meeting or bring to meeting? Emailing prior to the meeting is good. You can send back marked-up reports, comments, etc.

HHC Calculator Tool – How do criteria change as inputs change

Nancy presented the HHC Calculator Tool. As was discussed previously, there are certain elements of the HHC Equations that make a bigger difference than others. The workgroup can use this tool to see the differences.

Nancy took the workgroup back to look at the HHC Equations as shown on PowerPoint slide 7. The HHC has two formulas: one for carcinogens and one for non-carcinogens. Some of the numbers that will be plugged into the formula come from EPA. For other numbers, DEC will determine the final inputs used to derive Alaska HHC. These include cancer risk level, fish consumption rate, and relative source contribution.

Division of Water
Human Health Criteria (HHC) Technical Workgroup
Meeting #4 Notes (Draft)
January 4, 2016

- Q: Where do these formulas come from, can the formula be changed and why is there no relative source contribution factor for carcinogens?
 - A: (EPA)
 - The formula comes from the 2000 Heath Criteria Methodology. As far as flexibility to change formula, there really isn't any.
 - For carcinogens you're only looking at an incremental risk level posed by carcinogens in water only. For non-carcinogens, you are looking at reference dose that expresses the total risk from all sources and exposure routes, so a relative source contribution factor is necessary.
- Q: Are any of these compounds mutagenic? Are childhood exposures associated with the risk for carcinogens? (Ted).
 - A: (EPA) The methodology doesn't look at exposure for children. Formula doesn't really do this since it is specifically for adult exposure factors. We could have a side a discussion on specific chemicals.

Nancy directed the workgroup back to the spreadsheet and explained that different chemicals are listed in the first column. For carcinogens, there is a cancer slope factor. When you have a low cancer slope factor, then the concentrations can be higher before the risk level is reached.

For non-carcinogens there is a reference dose which includes safety factors depending on the uncertainties in studies that determine the no effects level.

Nancy showed different scenarios by changing the numbers in the Key Inputs table. When numbers are changed in the Key Inputs table, the values in the spreadsheet change. Nancy plugged in low and high numbers to show what happens to the values in the spreadsheet. Depending on the numbers entered in the Key Inputs table, different parts of the HHC Equation become the driver.

Nancy noted that the calculator shows draft HHC values and compares them to the EPA proposed HHC for Washington (WA) State. The default cancer risk is 10^{-5} for the draft HHC calculations. WA State numbers are EPA's proposed HHC using 10^{-6} risk level. WA State HHC are still in draft and haven't been finalized yet.

Nancy highlighted that the takeaway message is that the fish consumption rate makes a big difference for bioaccumulative pollutants.

- If the chemical doesn't bioaccumulate, and there is a low cancer slope factor, you will have higher concentrations for the HHC value (e.g. 1,2-dichloroethane).
- The water intake is the risk driver for non-bioaccumulative pollutants (e.g. acrylonitrile) and the difference in values between the organism + water criterion and the organism only criterion will be large.
- If the chemical has a high cancer slope factor and bioaccumulates, you will have the lowest concentrations for criteria values (e.g. DDT) and the values will be the same for the organism + water criterion and the organism only criterion.

**Division of Water
Human Health Criteria (HHC) Technical Workgroup
Meeting #4 Notes (Draft)
January 4, 2016**

Nancy then looked at examples of non-carcinogens, specifically cyanide and endrin. Cyanide doesn't bioaccumulate; however, it has a stringent reference dose because it is very toxic. Reference dose is the driving factor here. EPA lowered the reference dose for cyanide in 2015 and added a safety factor of 3,000. The safety factor was high because of the uncertainty from limited studies on non-human test subjects (rats). As a result, HHC for cyanide went from about 700 to 4 µg/l in 2015 revisions of EPA nationally recommended water quality criteria.

Comment: It is important to reference where the numbers come from so that the documentation is available during the process of developing regulations.

Nancy next looked at the chemical endrin. The national recommended criteria are less stringent than proposed WA criteria which uses a fish consumption rate of 175 g/day. Because endrin is a bioaccumulative pollutant, the fish consumption rate is the risk driver causing big changes to the criteria. If the pollutant is mostly coming from the fish and we eat a lot of fish, then the criteria is more stringent.

Relative source contribution (RSC) also makes a difference. The national RSC usually defaults to 0.2, but EPA has used a RSC value of 0.8 for endrin. The less a pollutant can be attributed to sources not regulated by the Clean Water Act, the lower the RSC and the more stringent the criterion derived from the HHC equation. The lower the value- the more uncertainty associated with where the body burden comes from.

EPA methodology includes a decision tree used to determine RSC for each contaminant. Lon will provide a reference to the decision tree.

Summary: For carcinogens, cancer risk level and bioaccumulation matters. For non-carcinogens, relative source and bioaccumulation matters.

Discussion

- Q: How is the bioaccumulation factor determined? What chemicals bioaccumulate?
 - A: EPA has made that determination. It's in the Human Health Methodology and pollutant criteria documents.
- Q: How is the list of chemicals for human health criteria determined? How does a compound get on the list?
 - A: The chemicals on the list are ones for which EPA has derived criteria. If a particular chemical is in a discharge, but does not have a national HHC, then the water quality standards also include narrative language that allows a particular criteria to be calculated based on available toxicity information and the HHC methodology.
 - A: The nationally recommended criteria come from EPA's priority pollutants listed in the Clean Water Act [see section 304(a)].
- Q: For example, how is lead treated?

Division of Water
Human Health Criteria (HHC) Technical Workgroup
Meeting #4 Notes (Draft)
January 4, 2016

- A: Lead does not have an HHC. In this case, EPA is looking at required water quality criteria, and lead isn't a priority pollutant for Clean Water Act purposes.
- Q: For bioaccumulation, there appears to be two different columns. Why?
 - A: One column is for bioaccumulation factors (BAF), and the other column is for bioconcentration (BCF). BAF includes the exposure from the food web and water. BCF is based on only exposure to pollutants in the water column. Bioconcentration was used in original methodology. BAFs have been developed for most, but not all, bio-accumulative pollutants and are the preferred input for the HHC equation.
- Q: For endrin, is EPA saying that there is a greater risk from water and not from other sources?
 - A: Most of the risk comes from the fish, not the water. The higher RSC indicates that there is little exposure from other non-CWA sources (e.g. air, dermal contact).
- Q: Why are there three different trophic levels? Which ones are you using?
 - In spreadsheet, we are using Level 4. The actual HHC equation (20015 recommended values) uses three trophic levels (level 2, level 3 and level 4). We can tailor trophic levels depending on what species people are actually eating locally. In WA State, tribes eat higher trophic level fish. If we want to look at marine mammals, there could be another column added for trophic level 5 and it would probably be higher than the level 4 BAF. It matters how much of a community's diet is marine mammals and the trophic level of the particular species consumed by the community.
- The current drinking water standard for cyanide is 200 µg/l and the aquatic life chronic criterion is 5 µg/l, so future HHC for cyanide may become the most stringent criterion. Many WQS implementation tools assume that aquatic life criteria are the most stringent. It's important to realize that the impacts of revising HHC can't be considered in isolation. There are other uses that could be affected including drinking water and aquatic life.
- Q: Is there any allowance for the chemical form of pollutants when ingested as fish tissue.
 - EPA – you could do that. The reference dose for manganese varies depending on the food source. HHC generally deal with the pollutant in a water matrix. Fish tissue criteria are complicated. If dealing with the chemical forms of inorganic arsenic, that may be something to talk about.
 - Has any other states incorporated? Not to EPA's knowledge. Water quality standards deal with pollutants in water. Arsenic has relatively low bioaccumulation, so the HHC is driven as much by water concentration as by the fish tissue concentration.

Recap Issue #3 – What is the appropriate level of protection for Alaska and its residents?

Nancy started the discussion on the recap of Issue #3. There is not much data for non-consumers. DEC heard as a draft recommendation that DEC should use consumer-only data as long as the focus is on a fish consumption rate that protects rural populations.

With regard to population of concern, DEC heard as draft recommendations the following:

1. The protection of rural populations will likely protect urban populations. DEC should focus on studying rural populations to set the Alaska FCR.
2. Data on resident Asian/Pacific Islander population needs to be found and considered.

Division of Water
Human Health Criteria (HHC) Technical Workgroup
Meeting #4 Notes (Draft)
January 4, 2016

3. ADF&G harvest data may provide a basis for Alaska's FCR.
- Q: At last meeting, did we ask ADF&G draft up a probability distribution graph? It's hard to know if we're protecting consumers if we don't have a distribution curve to look at.
 - A: Yes. ADF&G confirmed that they can have the graph available in mid-late January.
 - Comment: For the population of concern, we need valid fish consumption rate data.

These are tentative recommendations and can be changed as we acquire more information. Please look at notes, make comments, and get back to us.

The percentile that DEC ultimately decides to use will be determined by other choices DEC makes regarding specific HHC formula values. A specific percentile has not been recommended by the workgroup at this time.

Recap Issue #4a (part one) – What species should Alaska include when deriving a Fish Consumption Rate? (See October meeting notes)

Previously, we looked at the issue of including all fish (market and local) or local fish only. What DEC heard in our notes as draft recommendations are the following:

1. The consumption of market fish may not be a factor for rural populations as compared to the consumption of locally-sourced fish and aquatic life.
 2. DEC should look for information to see if market fish are being sold in rural areas.
- It looks like all data is in rural areas. Would like to see what market fish are sold there. Also okay with using only local fish in rural areas. If we use the general population in urban areas, then we need to look at market fish.
 - For marine mammals, ADF&G data shows the consumption is significant in some areas.
 - How should we treat anadromous species (salmon)? Including or not including them is a big deal.
 - EPA made an observation on reasons to exclude. Some marine species are included in the national rate. The workgroup might want to refine to say that marine species that are not from coastal waters under CWA jurisdiction are excluded.
 - There are some exceptions to anadromous fish being marine fish. Specifically pink and chinook are fairly coastal.
 - Q (to ADF&G): Have you looked at where the fish go? Are there studies about where pink and chinook go?
 - ADF&G is not sure if they have studies on that specific topic. **ADF&G will look for studies about all 5 species of salmon.**
 - Q: Can EPA provide sources to studies for salmon that were done in EPA R10?
 - A: Yes. EPA also provided studies to Idaho about salmon migrating back to Idaho waters to spawn. Looking at agricultural contaminant patterns in the fish tissue. AK

Division of Water
Human Health Criteria (HHC) Technical Workgroup
Meeting #4 Notes (Draft)
January 4, 2016

probably doesn't have the same agricultural contaminants that are used in the Lower 48.

- In regions with high marine mammal consumption, the salmon aren't there for consumption. ADF&G Response: There are some salmon living in the North Slope Borough. There always have been. However, the number of salmon are increasing in arctic waters.
- Sockeye salmon spend about 1 year in lakes. This would be a reason to include them.
- Comment: Herring, herring eggs, halibut, and other fish caught in inside waters need to be considered.
- Are there truly marine fish? What kinds of fish may be outside of coastal waters that might be caught? It's really hard to know because fish move around. You can catch halibut, rockfish, etc. either within or outside of state waters.
- The key is the food web and where the fish are getting their contaminants. This is a complicated issue.
- Q: What about using lipid content to determine if it's a species we should look at? That would tell where they are feeding. How does that relate to how fish get their contaminants?
 - That's how most of the organic content gets in to fish tissue. May eventually get too complicated.
 - EPA: This is figured into relative source contribution.
- On the west coast, a recent study looked at contaminate fingerprints. EPA will look to see if there is similar research in Alaska.
- Q: What are the "fingerprint" contaminants? DDT is used in southern CA waters. PCB's are used for Puget Sound. The contaminants in fish tissue have different patterns based on fish movements. You can look at local contaminant sources and see if they show up in fish tissue? Yes, you look at contaminants in fish and see where it's travelled.
- That might be one way to differentiate species. There is probably some actual tracking information on salmon, so we may not have to rely on contaminant fingerprinting. There may be a couple of ways to determine if fish live inside and outside of the state's jurisdiction. DEC may need to refine the rationale used to include or exclude particular species.
- EPA has a section on species selection in 2015 criteria update.

Nancy continued the discussion of Issue #4a to ask how we should treat anadromous species. The PowerPoint slide listed reasons to include anadromous fish and reasons to exclude anadromous fish. If it is decided to include anadromous fish, there are three options for inclusion:

1. Option 1: Include at full rate
2. Option 2: Include at a reduced rate
3. Option 3: Do not include anadromous species

Each option also included reasons to include, reasons to exclude, and potential outcomes for each option.

Nancy asked if salmon should be included at the full rate or at a lesser rate. Other states (OR and WA) have included salmon at the full rate. It depends on how much detail you want to get into. There is some interest in looking into where fish are feeding and where salmon and marine

Division of Water
Human Health Criteria (HHC) Technical Workgroup
Meeting #4 Notes (Draft)
January 4, 2016

mammals go. These are some things that we have to look into before making a decision about salmon.

Anyone feel strongly about including or excluding salmon in the fish consumption rate?

- A couple of workgroup members felt strong that salmon should be included.
- Another workgroup member wanted to see more information and how the salmon habitat breaks down by species. There was a strong desire to have scientific support for making this decision.
- EPA asked if ADF&G had any info about fish contamination. **ADF&G responded that they do and have it broken it out and on their web page. There is also a section on forage fish and shell fish/ invertebrates.**
- One of the points I think about when writing regulations is that regulations are based on definitions. We need to make sure we're consistent with our definitions. If we're going to use a term, what is the definition? The intention of the regulations as a tool. The issue with salmon goes back to how we define the fish we're going to incorporate into the HHC. We have to come back and make sure those definitions are clear before we go down the road to proposing HHC. Almost any organism that lives in the sea will eat some food from the coastal environment. We want a rock to stand on for our decisions.
- Q: Are we likely to get that definition from the CWA?
- Q: At the bottom of p. 3 in the draft Technical Report, there is reference to the HHC. Where did the phrase about marine water come from? I was thinking it would lead back to the source and maybe that source would help clarify definitions.
 - A: EPA thinks it's just a clarifying comment and may not have a specific source.
 - Please include these comments in the Technical Report mark-up, and Nancy will look into this.

Other marine fish and mammals

Nancy asked what the workgroup thought about including marine mammals. A lot of marine mammals feed in coastal waters.

- Q: What are the main species taken for subsistence?
 - Excluding bowhead whale, it's seals. The type of seal varies depending on where you are. As you go further south, it's seals and walrus.
- Q: This is a food web question – where are they getting their food?
 - The food is probably originating in coastal waters.
- Q: Since we're trying to address fish consumption, are marine mammals addressed through relative source contribution?
 - That is one approach. They're not fish!
- Q: Would marine mammals be affected by water quality criteria?
- It would be nice to look at species used for subsistence and get more information on them. But it could also be a matter of relative source contribution.
- Adding marine mammals to the fish consumption rate adds a greater level of complexity.
- It depends on whether we do regional rate or not. ID & WA looked into this.

Division of Water
Human Health Criteria (HHC) Technical Workgroup
Meeting #4 Notes (Draft)
January 4, 2016

- I'm uncomfortable with getting into a discussion about what's easy and what's hard. We might want to think about this a little bit. A lot of people in Alaska live by the coast. Food from coastal sources is traded up and down the river. There are a lot of issues here because of the diverse and spread out population.
- I'm concerned that the relative source contribution isn't included in the HHC equation for carcinogens.
- Q: The discussion started with salmon and then went to marine mammals. How much of an impact would there be if we put marine mammals into the formula?
 - A: It would be big for some pollutants and not much for others. For chemicals that bioaccumulate, it is a big deal, and it drives the criteria numbers much lower.
- It would be ideal if we had exposure data. The question is: for deep marine fish, there is no good quantitative way to say what their exposure is. If put salmon in, you are making sure you're accounting for it.
- ADF&G: Salmon make up about 60-65% of subsistence consumption statewide. Marine mammals make up about 14% statewide. This varies greatly by region. There are also fish species substitutions when traditional fish/food isn't available.
- Substitutions make it more complicated. For example, if salmon consumption goes down, then the consumption of pike increases. Pike has higher trophic level and more contaminants. Trophic level 4 would cover most issues and provide sufficient safety for exposure to bioaccumulative pollutants.
- ADF&G: Another thing we could look at is the ratio of consumption of fish vs. marine mammals. We could compare to different areas. This comparison would be done in weight of fish and weight of marine mammals.
- EPA: It would be interesting to see bioaccumulation factor for marine mammals.
- Q: Could ADF&G provide to the workgroup a list of the top 3 marine mammals used for consumption and the trophic levels for those species?

Public Comment

- Salmon should be included in the fish consumption rate. Bristol Bay has all 5 species of salmon and uses them all.
- The work that is being done is quite interesting and could lead to changes in the HHC. Somewhere in the process there needs to be a look at the current risk to fish and shellfish consumers and how it relates to tools available through the CWA. If the CWA tools can't affect change, you need to be careful about making changes to HHC. I'm thinking about PCPs, arsenic in bivalves, smoked fish, etc. Super stringent criteria can force regulations where CWA tools can't do anything to reduce the source of pollution.
- There may not be much of a difference between market and locally caught fish since Alaska Seafood Marketing Institute (ASMI) has done a good job of marketing fish in state.
- EPA: Developing human health criteria is an analysis of human health risks. Implementation of HHC is a separate phase. Feasibility of implementation needs to be taken into consideration, but should be done after the criteria are determined.
- DEC: Implementation tools are an issue we know we need to address in parallel to adopting new criteria.

**Division of Water
Human Health Criteria (HHC) Technical Workgroup
Meeting #4 Notes (Draft)
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